

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant:	Sendyne Corporation	Examiner:	Martin, Angela J.
Serial No.:	10/528,513	Group Art Unit:	1795
Filing Date:	January 15, 2004	Confirmation No.:	4366
Title:	Fuel Supply Method for Direct Methanol Fuel Cell	Attorney Docket No.	SNDN.P-002-USNP

**BRIEF FOR APPELLANT**

In response to the second non-final Office Action mailed on December 14, 2007 for the above-captioned application (hereinafter, the Office Action), the present appeal brief is respectfully submitted.

**(i) Real Party in Interest**

The real party of interest submitting this appeal brief is the Sendyne Corporation, the assignee.

**(ii) Related Appeals and Interferences**

The Appellant is unaware of any other related prior or pending appeals or interference proceedings.

**(iii) Status of Claims**

Claims 1-14 and 16-19 currently stand rejected. Claim 15 is canceled. The rejections of claims 1-14 and 16-19 are being appealed.

**(iv) Status of Amendments**

A minor amendment to the claims was filed on May 20, 2008 (an erroneous dependency in claim 19 was corrected) and is still pending as of the filing of this appeal brief.

(v) **Summary of Claimed Subject Matter**

The invention is directed to providing both apparatus and methods for optimizing a fuel cell's efficiency and length of operating cycle. One means employed for achieving this goal is by way of introducing at appropriate times and infusion of higher-concentration methanol-water solution into the main fuel container to make up for depletion. Another means employed is by causing the methanol-water solution in the fuel container to be stirred so that cell efficiency is maintained by preventing depleted layers of solution from remaining at the surface of the anode.

The application in its current form contains independent claims 1, 6, 11, 13, 14, and 16, the subject matter for each of which is described as follows:

Claim 1 is an original claim and claims a direct methanol fuel cell apparatus comprising:

- a fuel container (see Figures 3 and 4: 1; see specification paragraphs 14-16, 27, 29-31, 33, 36-38, 40, and 43)
- an anode adjacent the fuel container (see Figures 3 and 4: anode; see specification paragraphs 27-30);
- a proton exchange membrane adjacent the anode (see Figures 3 and 4: proton exchange membrane; see specification paragraphs 30 and 40-41);
- a cathode adjacent the proton exchange membrane (see Figures 3 and 4: cathode; see specification paragraph 30);
- an oxygen supply adjacent the cathode (see Figures 3 and 4: OXYGEN; see specification paragraph 30);
- the fuel container containing methanol in water at a first concentration (see Figures 3 and 4: 2; see specification paragraphs 15, 27-29, 31, 36-38, 40-41, and 46);
- a cartridge selectively communicatively coupled with the fuel container (see Figures 3 and 4: 3; see specification paragraphs 14, 16, 17, 21-22, 30-33, and 44-45); and
- the cartridge containing fluid comprising methanol in water at a second concentration, the second concentration higher than the first concentration (see Figures 3 and 4: 4; see specification paragraphs 16 and 40).

Claim 6 is a previously amended claim and claims a method for use with a direct methanol fuel cell comprising the steps of:

- bringing a first solution of methanol in water at a first concentration into contact with an anode, the first solution within a container (see Figures 3 and 4: 1, 2, and anode; see specification paragraphs 14-16, 27-31, 33, 36-38, 40, and 43);
- bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode (see Figures 3 and 4: 2, cathode, proton exchange membrane; see specification paragraphs 15, 27-31, 36-38, 40-41, and 46); and
- at a later time, bringing a cartridge into communicative coupling with the container, the volume of the container being greater than the volume of the cartridge, the cartridge containing a second solution of methanol in water at a second concentration, the second concentration higher than the first concentration (see Figures 3 and 4: 3; see specification paragraphs 14, 16, 17, 21-22, 30-33, and 44-45).

Claim 11 is an original claim and claims a direct methanol fuel cell apparatus comprising:

- a fuel container (see Figures 3 and 4: 1; see specification paragraphs 14-16, 27, 29-31, 33, 36-38, 40, and 43)
- an anode adjacent the fuel container (see Figures 3 and 4: anode; see specification paragraphs 27-30);
- a proton exchange membrane adjacent the anode (see Figures 3 and 4: proton exchange membrane; see specification paragraphs 30 and 40-41);
- a cathode adjacent the proton exchange membrane (see Figures 3 and 4: cathode; see specification paragraph 30);
- an oxygen supply adjacent the cathode (see Figures 3 and 4: OXYGEN; see specification paragraph 30);
- the fuel container containing methanol in water (see Figures 3 and 4: 2; see specification paragraphs 15, 27-29, 31, 36-38, 40-41, and 46); and
- a stirrer within the fuel container (see Figures 4 and 5: 5-7, 23; see specification paragraph 29).

Claim 13 is a previously amended claim and claims a method for use with a direct methanol fuel cell comprising the steps of:

- bringing a first solution of methanol in water at a first concentration into contact with an anode, the solution within a container (see Figures 3 and 4: 1, 2, and anode; see specification paragraphs 14-16, 27-31, 33, 36-38, 40, and 43);
- bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode (see Figures 3 and 4: 2, cathode, proton exchange membrane; see specification paragraphs 15, 27-31, 36-38, 40-41, and 46); and
- at a later time, stirring the solution wherein the stirring occurs as a result of stirring by a stirrer contained within the container (see Figures 4 and 5: 5-7, 23; see specification paragraph 29).

Claim 14 is a previously amended claim and claims a method for use with a direct methanol fuel cell comprising the steps of:

- bringing a first solution of methanol in water at a first concentration into contact with an anode, the solution within a container (see Figures 3 and 4: 1, 2, and anode; see specification paragraphs 14-16, 27-31, 33, 36-38, 40, and 43);
- bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode (see Figures 3 and 4: 2, cathode, proton exchange membrane; see specification paragraphs 15, 27-31, 36-38, 40-41, and 46); and
- at a later time, stirring the solution wherein the stirring occurs as a result of a human user moving the fuel cell while it is in use (see specification paragraph 47).

Claim 16 is a previously presented claim and claims a direct methanol fuel cell apparatus comprising:

- a fuel container (see Figures 3 and 4: 1; see specification paragraphs 14-16, 27, 29-31, 33, 36-38, 40, and 43)
- an anode adjacent the fuel container (see Figures 3 and 4: anode; see specification paragraphs 27-30);
- a proton exchange membrane adjacent the anode (see Figures 3 and 4: proton exchange membrane; see specification paragraphs 30 and 40-41);
- a cathode adjacent the proton exchange membrane (see Figures 3 and 4: cathode; see specification paragraph 30);

- an oxygen supply adjacent the cathode (see Figures 3 and 4: OXYGEN; see specification paragraph 30);
- the fuel container containing methanol in water at a first concentration (see Figures 3 and 4: 2; see specification paragraphs 15, 27-29, 31, 36-38, 40-41, and 46);
- a cartridge selectively communicatively coupled with the fuel container (see Figures 3 and 4: 3; see specification paragraphs 14, 16, 17, 21-22, 30-33, and 44-45);
- the fuel container having a greater volume than that of the cartridge (see Figures 3 and 4: 2, 3); and
- containing fluid comprising methanol in water at a second concentration, the second concentration higher than the first concentration (see Figures 3 and 4: 4; see specification paragraphs 16 and 40).

**(vi) Grounds of Rejection to Be Reviewed on Appeal**

**Issue 1**

The Examiner has introduced a new ground of rejection that was not presented in the first Office Action: Independent claim 6 has been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, the Examiner supposedly finds the term “at a later time,” which appears in the last element of claim 6, to be a “relative term which renders the claim indefinite.” The Examiner further asserts that the specification supposedly provides no “standard” for one of ordinary skill in the art to ascertain “the requisite degree.”

**Issue 2**

The Examiner has introduced a new ground of rejection that was not presented in the first Office Action: Independent claims 13 and 14 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, the Examiner supposedly finds the term “at a later time,” which appears in the last element of each of claims 13 and 14, to be a “relative term which renders the claim indefinite.” The Examiner further asserts that the specification supposedly provides no “standard” for one of ordinary skill in the art to ascertain “the requisite degree.”

### Issue 3

Independent claims 1 and 16 have been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren *et al.*, U.S. Pat. No. 6,981,877 B2 (hereinafter, “Ren”). On a related note, dependent claim 4, which is dependent on claim 1, has been rejected under 35 U.S.C. § 103(a) as supposedly being obvious in view of Ren, in further view of Becerra *et al.*, U.S. Pat. Application Pub. 2004/0072049 (hereafter “Becerra”). However, the fate of claim 4 is necessarily tied to the fate of claim 1.

### Issue 4

Dependent claim 5 has been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren.

### Issue 5

Dependent claims 17 and 18 have been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren.

### Issue 6

Dependent claim 19 has been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren.

### Issue 7

Independent claim 6 and dependent claim 10 have been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren. On a related note, dependent claim 9, which is dependent on claim 6, has been rejected under 35 U.S.C. § 103(a) as supposedly being obvious in view of Ren, in further view of Becerra. However, the fate of claim 9 is necessarily tied to the fate of claim 6.

### Issue 8

Independent claim 11 and dependent claim 12 have been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Beckmann *et al.*, U.S. Pat. No. 6,737,181 B2 (hereinafter “Beckmann”).

### Issue 9

Independent claim 13 has been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Beckmann.

#### Issue 10

Dependent claims 2 and 7 have been rejected under 35 U.S.C. § 103(a) as supposedly being obvious in view of Ren. Further, the Examiner cites *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (MPEP § 2144.05(II), “Optimization of Ranges”) in asserting that differences of temperature and concentration will not allow patentability over the prior art unless such differences are “critical”. See MPEP § 2144.05(II)(A), (III).

#### Issue 11

Dependent claims 3 and 8 have been rejected under 35 U.S.C. § 103(a) as supposedly being obvious in view of Ren. Further, the Examiner cites *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (MPEP § 2144.05(II), “Optimization of Ranges”) in asserting that differences of temperature and concentration will not allow patentability over the prior art unless such differences are “critical”. See MPEP § 2144.05(II)(A), (III).

#### Issue 12

Independent claim 14 has been rejected under 35 U.S.C. § 102(e) as supposedly anticipated by Beckmann. Alternatively, the Examiner has rejected independent claim 14 under 35 U.S.C. § 103(a) as supposedly obvious in view of Beckmann.

#### (vii) Argument

##### **Issue 1 — Indefiniteness Rejection of Claim 6 Under 35 U.S.C. § 112**

In the Office Action, page 2, item 2, the Examiner introduced a new ground of rejection not presented in the first Office Action, namely that the Examiner rejected independent claim 6 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, the Examiner supposedly finds the term “at a later time,” which appears in the last element of each of claim 6 to be a “relative term which renders the claim indefinite.” The Examiner further asserts that the specification supposedly provides no “standard” for one of ordinary skill in the art to ascertain “the requisite degree.”

Currently-amended claim 6 is:

A method for use with a direct methanol fuel cell, the method comprising the steps of:

bringing a first solution of methanol in water at a first concentration into contact with an anode, the first solution contained within a container;

bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;

at a later time, bringing a cartridge into communicative coupling with the container, the volume of the container being greater than the volume of the cartridge, the cartridge containing a second solution of methanol in water at a second concentration, the second concentration higher than the first concentration.

Claim 6 unambiguously indicates that a cartridge is not to be brought into communicative coupling with the container until after oxygen is brought into contact with the cathode. Hence, if a person brings a cartridge into communicative coupling with the container *before, or at the same times as*, oxygen is brought into contact with the cathode, then there would be *no* infringement. Conversely, if a person brings a cartridge into communicative coupling with the container *after* oxygen is brought into contact with the cathode, then there would be infringement. The specification and drawings provide further support with multiple examples of a fuel cell in operation (meaning, among other things, that oxygen has been brought into contact with the cathode) with the subsequent introduction of a cartridge containing the second solution. See paragraphs 14-17, 30-31, 33, and 38-40 of the specification, and Figure 6.

Accordingly, the Applicant respectfully requests that the Examiner's 35 U.S.C. § 112, second paragraph, rejection of claim 6 be reversed.

#### **Issue 2 — Indefiniteness Rejection of Claims 13 and 14 Under 35 U.S.C. § 112**

In the Office Action, page 2, item 2, the Examiner introduced a new ground of rejection not presented in the first Office Action, namely that the Examiner rejected independent claims 13 and 14 rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, the Examiner supposedly finds the term “at a later time,” which appears in the last element of each of claims 13 and 14, to be a “relative term which renders the claim indefinite.” The Examiner further asserts that the specification supposedly provides no “standard” for one of ordinary skill in the art to ascertain “the requisite degree.”

#### **Claim 13**

Previously presented claim 13 is:



A method for use with a direct methanol fuel cell, the method comprising the steps of:

bringing a solution of methanol in water at a first concentration into contact with an anode, the solution contained within a container;

bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;

at a later time, stirring the solution wherein the stirring occurs as a result of stirring by a stirrer contained within the container.

#### Claim 14

Previously presented claim 14 is:

A method for use with a direct methanol fuel cell, the method comprising the steps of:

bringing a solution of methanol in water at a first concentration into contact with an anode, the solution contained within a container;

bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;

at a later time, stirring the solution, wherein the stirring occurs as a result of a human user moving the fuel cell while it is in use.

Each of claims 13 and 14 unambiguously indicates that stirring the solution is not to occur until after oxygen is brought into contact with the cathode. Hence, if a person stirs the solution *before, or at the same times as*, oxygen is brought into contact with the cathode, then there would be *no* infringement. Conversely, if a person stirs the solution *after* oxygen is brought into contact with the cathode, then there would be infringement. The specification and drawings provide further support with multiple examples of a fuel cell in operation (meaning, among other things, that oxygen has been brought into contact with the cathode) with the subsequent stirring of the solution. See paragraphs 27-29, 31, 34-38, and 43 of the specification, and Figure 2.

Accordingly, the Applicant respectfully requests that the Examiner's 35 U.S.C. § 112, second paragraph, rejection of claims 13 and 14 be reversed.

### **Issue 3 — Anticipation Rejection of Claims 1 and 16 Under 35 U.S.C. § 102(e)**

In the Office Action, page 3, item 2, independent claims 1 and 16 have been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren. It should be noted that claim 1 was similarly rejected in the previous Office Action dated June 25, 2007, while this rejection is now being extended to new claim 16 introduced in the Response to that Office Action.

On a related note, the Examiner also rejected in the Office Action, page 6, item 6, dependent claim 4 has been rejected under 35 U.S.C. § 103(a) as supposedly being obvious in view of Ren, in further view of Becerra. However, for dependent claim 4 to be obvious in view of alleged prior art, its parent claim 1 necessarily would have to be rejected similarly.

#### **Claim 1**

Claim 1 is:

Direct methanol fuel cell apparatus comprising:

- a fuel container;
- an anode adjacent the fuel container;
- a proton exchange membrane adjacent the anode;
- a cathode adjacent the proton exchange membrane;
- an oxygen supply adjacent the cathode;
- the fuel container containing methanol in water at a first concentration;
- a cartridge selectively communicatively coupled with the fuel container;
- the cartridge containing fluid comprising methanol in water at a second concentration, the second concentration higher than the first concentration.

The Examiner is of the view that col. 5, lines 49-67, of Ren teaches each of the limitations of claim 1. The undersigned has diligently studied this portion of Ren and is unable to find a disclosure of “an anode adjacent the fuel container”. Moreover, the Examiner failed to respond in any way to this very argument presented by the Applicant after the first Office Action, dated June 25, 2007. The most reasonable conclusion is that the Examiner was in error when alleging that all of the limitations of claim 1 are taught in Ren.

Accordingly, the Applicant respectfully requests that the Examiner’s 35 U.S.C. § 102(e) rejection of claim 1 be reversed.

#### Claim 16

Claim 16 is:

Direct methanol fuel cell apparatus comprising:

- a fuel container;
- an anode adjacent the fuel container;
- a proton exchange membrane adjacent the anode;
- a cathode adjacent the proton exchange membrane;
- an oxygen supply adjacent the cathode;
- the fuel container containing methanol in water at a first concentration;
- a cartridge selectively communicatively coupled with the fuel container;
- the fuel container having a greater volume than that of the cartridge;
- the cartridge containing fluid comprising methanol in water at a second concentration, the second concentration higher than the first concentration.

The Examiner is of the view that col. 5, lines 49-67, of Ren teaches each of the limitations of claim 16. The undersigned has diligently studied this portion of Ren and is unable to find a disclosure of “an anode adjacent the fuel container”. As discussed for claim 1 above, the most reasonable conclusion is that the Examiner was in error when alleging that all of the limitations of claim 16 are taught in Ren.

Accordingly, the Applicant respectfully requests that the Examiner’s 35 U.S.C. § 102(e) rejection of claim 16 be reversed.

#### Claim 4

Claim 4 is:

The apparatus of claim 1 wherein the selective communicative coupling comprises a pushing pin actuatable by a human user, said pin puncturing the cartridge.

Claim 4 depends on claim 1. Based on arguments presented above, claim 1 is allowable; therefore, claim 4 should also be allowable. Accordingly, the Applicant respectfully requests that the Examiner’s 35 U.S.C. § 103(a) rejection of claim 4 be reversed.

#### **Issue 4 — Anticipation Rejection of Claim 5 Under 35 U.S.C. § 102(e)**

In the Office Action, page 3, item 2, dependent claim 5 has been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren. It should be noted that claim 5 was similarly rejected in the previous Office Action dated June 25, 2007.

The Examiner is of the view that col. 5, lines 49-67, of Ren teaches each of the limitations of dependent claim 5, which incorporates all of the limitations of claim 1.

Claim 5 is:

The apparatus of claim 1 wherein the selective communicative coupling comprises a pump actuable by electronic means, said pump pumping fluid from the cartridge to the container.

The undersigned has diligently studied this portion of Ren and is unable to find a disclosure of “an anode adjacent the fuel container”. As discussed for claim 1 above, the most reasonable conclusion is that the Examiner was in error when alleging that all of the limitations of claim 5 are taught in Ren.

Accordingly, the Applicant respectfully requests that the Examiner’s 35 U.S.C. § 102(e) rejection of claim 5 be reversed.

#### **Issue 5 — Anticipation Rejection of Claims 17 and 18 Under 35 U.S.C. § 102(e)**

In the Office Action, page 3, item 2, dependent claims 17 and 18 have been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren. As dependent claims 17 and 18 are dependent on claim 4, which is in turn dependent on claim 1, it should be noted that claim 1 was similarly rejected in the previous Office Action dated June 25, 2007, while this rejection is now being extended to new claims introduced in the Response to that Office Action.

#### **Claim 17**

The Examiner is of the view that col. 5, lines 49-67, of Ren teaches each of the limitations of dependent claim 17, each of which incorporates all of the limitations of dependent claim 4, which in turn incorporates all of the limitations of claim 1.

Claim 4 is:

The apparatus of claim 1 wherein the selective communicative coupling comprises a pushing pin actuable by a human user, said pin puncturing the cartridge.

Claim 17 is:

The apparatus of claim 4 further comprising a safety lock serving to prevent inadvertent pushing of the pushing pin.

The undersigned has diligently studied this portion of Ren and is unable to find a disclosure of “an anode adjacent the fuel container”. In addition, the undersigned has diligently studied this portion of Ren and is unable to find a disclosure of “a pushing pin” (claims 4 and 17) or a “safety lock” (claim 17). As discussed for claim 1 above, the most reasonable conclusion is that the Examiner was in error when alleging that all of the limitations of claim 17 are taught in Ren.

Accordingly, the Applicant respectfully requests that the Examiner’s 35 U.S.C. § 102(e) rejection of claim 17 be reversed.

#### Claim 18

The Examiner is of the view that col. 5, lines 49-67, of Ren teaches each of the limitations of dependent claim 18, each of which incorporates all of the limitations of dependent claim 4, which in turn incorporates all of the limitations of claim 1.

Claim 4 is:

The apparatus of claim 1 wherein the selective communicative coupling comprises a pushing pin actuatable by a human user, said pin puncturing the cartridge.

Claim 18 is:

The apparatus of claim 4 further characterized in that the pin is movable in relation to the fuel container.

The undersigned has diligently studied this portion of Ren and is unable to find a disclosure of “an anode adjacent the fuel container”. In addition, the undersigned has diligently studied this portion of Ren and is unable to find a disclosure of “a pushing pin”. As discussed for claim 1 above, the most reasonable conclusion is that the Examiner was in error when alleging that all of the limitations of claim 18 are taught in Ren.

Accordingly, the Applicant respectfully requests that the Examiner’s 35 U.S.C. § 102(e) rejection of claim 18 be reversed.

### **Issue 6 — Anticipation Rejection of Claim 19 Under 35 U.S.C. § 102(e)**

In the Office Action, page 3, item 2, dependent claim 19 has been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren. As currently amended dependent claim 19 is dependent on claim 1, it should be noted that claim 1 was similarly rejected in the previous Office Action dated June 25, 2007, while this rejection is now being extended to new claim 19 introduced in the Response to that Office Action.

The Examiner is of the view that col. 5, lines 49-67, of Ren teaches each of the limitations of dependent claim 19, which incorporates all of the limitations of claim 1.

Currently amended claim 19 is:

The apparatus of claim 1 further characterized in that the cartridge selectively communicatively coupled with the fuel container is stationary with respect to the fuel container.

The undersigned has diligently studied this portion of Ren and is unable to find a disclosure of “an anode adjacent the fuel container”. Therefore, not all of the limitations of claim 19 are taught in Ren.

Accordingly, the Applicant respectfully requests that the Examiner’s 35 U.S.C. § 102(e) rejection of claim 19 be reversed.

### **Issue 7 — Anticipation Rejection of Claims 6 and 10 Under 35 U.S.C. § 102(e)**

In the Office Action, page 3, item 2, independent claim 6 and dependent claim 10 have been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Ren. It should be noted that claims 6 and 10 were similarly rejected in the previous Office Action dated June 25, 2007.

On a related note, the Examiner also rejected in the Office Action, page 6, item 6, dependent claim 9 has been rejected under 35 U.S.C. § 103(a) as supposedly being obvious in view of Ren, in further view of Becerra. However, for dependent claim 9 to be obvious in view of alleged prior art, its parent claim 6 necessarily would have to be rejected similarly.

#### **Claim 6**

Previously-presented claim 6 is:

A method for use with a direct methanol fuel cell, the method comprising the steps of:

bringing a first solution of methanol in water at a first concentration into contact with an anode, the first solution contained within a container;

bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;

at a later time, bringing a cartridge into communicative coupling with the container, the volume of the container being greater than the volume of the cartridge, the cartridge containing a second solution of methanol in water at a second concentration, the second concentration higher than the first concentration.

Unfortunately, the Examiner failed to respond in any way to the Applicant's amendment to claim 6, the additional limitation of which is supported in Figures 3, 4, and 5 of the present application. The Applicant asserts that the addition of the above limitation separates claim 6 from Ren. The Examiner supposedly found the various elements of claim 6 strewn throughout the Ren specification: the first element (col. 9, lines 5-17), the second element (col. 5, lines 49-67), and the third element (col. 9, lines 63-67; col. 10, lines 1-5; and col. 9, lines 9-17). The undersigned has diligently studied these portions of Ren and is unable to find a disclosure of "the volume of the container being greater than the volume of the cartridge." Moreover, the Applicant disputes that the Ren specification provides enough cooperation between the disparate and non-ordered passages cited by the Examiner to inform one ordinarily skilled in the art of the Applicant's claim 6; that is, to bring all of the elements of claim 6 together. Therefore, not all of the limitations of claim 6 are taught in Ren.

Accordingly, the Applicant respectfully requests that the Examiner's 35 U.S.C. § 102(e) rejection of claim 6 be reversed.

#### Claim 10

Previously-presented claim 10 is:

The method of claim 6 wherein the step of bringing the cartridge into communicative coupling with the container comprises actuating a pump, said pump pumping fluid from the cartridge to the container.

Unfortunately, the Examiner failed to respond in any way to the Applicant's amendment to claim 6, upon which claim 10 is dependent. If claim 6 is allowable for the reasons discussed above for claim 6, then claim 10 is necessarily allowable.

Accordingly, the Applicant respectfully requests that the Examiner's 35 U.S.C. § 102(e) rejection of claim 10 be reversed.

Claim 9

Claim 9 is:

The method of claim 6 wherein the step of bringing the cartridge into communicative coupling with the container comprises a human user pushing a pin, said pin puncturing the cartridge.

Claim 9 depends on claim 6. Based on arguments presented above, claim 6 is allowable; therefore, claim 9 should also be allowable. Accordingly, the Applicant respectfully requests that the Examiner's 35 U.S.C. § 103(a) rejection of claim 9 be reversed.

**Issue 8 — Anticipation Rejection of Claims 11 and 12 Under 35 U.S.C. § 102(e)**

In the Office Action, page 4, item 3, independent claim 11 and dependent claim 12 have been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Beckmann.

Claim 11

Claim 11 is:

Direct methanol fuel cell apparatus comprising:

- a fuel container;
- an anode adjacent the fuel container;
- a proton exchange membrane adjacent the anode;
- a cathode adjacent the proton exchange membrane;
- an oxygen supply adjacent the cathode;
- the fuel container containing methanol in water; and
- a stirrer within the fuel container.

The Examiner is of the view that the limitations of claim 11 are taught in Beckmann in col. 2, lines 26-32 and col. 3, lines 20-34. The undersigned has diligently studied this portion of Beckmann and is unable to find a disclosure of "an anode adjacent the fuel container". In addition, the undersigned has diligently studied this portion of Beckmann and is unable to find a disclosure of "a stirrer *within* the fuel container." Rather, it appears that Beckmann discloses a



*separate* mixing chamber. Moreover, the Examiner failed to respond in any way to this very argument presented by the Applicant after the first Office Action, dated June 25, 2007. The most reasonable conclusion is that the Examiner was in error when alleging that all of the limitations of claim 11 are taught in Beckmann.

Accordingly, the Applicant respectfully requests that the Examiner's 35 U.S.C. § 102(e) rejection of claim 11 be reversed.

#### Claim 12

Claim 12 is:

The apparatus of claim 11 further comprising electronics operating the stirrer at intervals as a function of measurements made regarding the fuel cell apparatus.

Claim 12 is dependent on claim 11 and necessarily incorporates all of the limitations of claim 11. Therefore, all of the Applicant's arguments for claim 11 above also apply to the Examiner's rejection of claim 12. The Applicant asserts that because the Examiner's 35 U.S.C. § 102(e) rejections of independent claim 11 should be reversed. Moreover, the Examiner failed to respond in any way to this very argument presented by the Applicant after the first Office Action, dated June 25, 2007. The most reasonable conclusion is that the Examiner was in error when alleging that all of the limitations of claim 11, and thus in claim 12, are taught in Beckmann.

In addition, the Examiner is of the view that the additional limitations of claim 12 are taught in Beckmann in col. 4, lines 9-27. The undersigned has diligently studied this portion of Beckmann and is unable to find a disclosure of "electronics operating the stirrer at intervals as a function of measurements made regarding the fuel cell apparatus", or any equivalent thereof. Rather, it appears that Beckmann only discloses the possibility of using an electrically actuated flapper to prevent overflow in the event the fuel chamber is inclined from horizontal (see Beckmann at col. 4, lines 9-13), and Beckmann also merely discloses a gas-driven, self-regulating and self-driven pump (see Beckman at col. 4, lines 15-27). For this reason alone, the Examiner's rejection of claim 12 is in error.

Accordingly, the Applicant respectfully requests that the Examiner's 35 U.S.C. § 102(e) rejection of claim 12 be reversed.

**Issue 9 — Anticipation Rejection of Claims 11 and 12 Under 35 U.S.C. § 102(e)**

In the Office Action, page 4, item 3, independent claim 13 has been rejected under 35 U.S.C. § 102(e) as supposedly being anticipated by Beckmann.

**Claim 13**

Previously presented claim 13 is:

A method for use with a direct methanol fuel cell, the method comprising the steps of:

bringing a solution of methanol in water at a first concentration into contact with an anode, the solution contained within a container;

bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;

at a later time, stirring the solution wherein the stirring occurs as a result of stirring by a stirrer contained within the container.

Unfortunately, the Examiner failed to respond in any way to the Applicant's amendment to claim 13, which was amended to include the limitation of now-canceled claim 15. The Examiner is of the view that col. 4, lines 9-27 of Beckmann discloses the additional limitation of now-canceled claim 15, which is now incorporated in claim 13. The undersigned has diligently studied this portion of Beckmann and is unable to find a disclosure of the stirring occurring as a result of stirring by a stirrer contained *within* the container. Rather, it appears that Beckmann discloses a mixing process taking place in a mixing chamber or pump *external* to the fuel container. Moreover, the Examiner failed to respond in any way to this very argument presented by the Applicant after the first Office Action, dated June 25, 2007. The most reasonable conclusion is that the Examiner was in error when alleging that all of the limitations of now-canceled claim 15 are taught in Beckmann.

Accordingly, the Applicant respectfully requests that the Examiner's 35 U.S.C. § 102(e) rejection of claim 13 be reversed.

**Issue 10 — Obviousness Rejection of Claims 2 and 7 Under 35 U.S.C. § 103(a)**

In the Office Action, page 5, item 5, dependent claims 2 and 7 have been rejected under 35 U.S.C. § 103(a) as supposedly being obvious in view of Ren. Further, the Examiner cites *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (MPEP § 2144.05(II)(A), "Optimization of Ranges") in asserting that differences of temperature and concentration will not

allow patentability over the prior art unless such differences are “critical”. See MPEP § 2144.05(II)(A), (III).

First of all, claim 2 depends on claim 1, while claim 7 depends on claim 6. Based on arguments above, both claims 1 and 6 are allowable; therefore, claims 2 and 7 should also be allowable.

In addition, the Examiner rejected claims 2 and 7 because, supposedly, “the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made,” and cited MPEP § 2144.05(II).

The Applicant has not claimed that the second concentration being at least double the first concentration is somehow “optimal;” therefore, the citation of MPEP § 2144.05(II) is inappropriate. The Applicant has merely presented these limitations to avoid accidental anticipation by inapposite prior art.

The Examiner has been requested in the previous response to the Office Action dated June 25, 2007 to provide the basis for the Examiner’s view that the limitations at issue represent optimization and to provide the basis for the Examiner’s assertion of obviousness in view of Ren, both motivated by *In re Ahlert and Kruger*, 165 USPQ 418 (CCPA 1970). Unfortunately, no basis has been offered by the Examiner.

Accordingly, the Applicant respectfully requests that the Examiner’s 35 U.S.C. § 103(a) rejection of claims 2 and 7 be reversed.

**Issue 11 — Obviousness Rejection of Claims 3 and 8 Under 35 U.S.C. § 103(a)**

In the Office Action, page 5, item 5, dependent claims 3 and 8 have been rejected under 35 U.S.C. § 103(a) as supposedly being obvious in view of Ren. Further, the Examiner cites *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (MPEP § 2144.05(II)(A), “Optimization of Ranges”) in asserting that differences of temperature and concentration will not allow patentability over the prior art unless such differences are “critical”. See MPEP § 2144.05(II)(A), (III).

First of all, claim 3 depends on claim 2, which depends on claim 1, while claim 8 depends on claim 7, which depends on claim 6. Based on arguments above, both claims 1 and 6 are allowable; therefore, claims 3 and 8 should also be allowable.

In addition, the Examiner rejected claims 3 and 8 because, supposedly, “the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made,” and cited MPEP § 2144.05(II).

The Applicant has not claimed that the second concentration being at least triple the first concentration is somehow “optimal;” therefore, the citation of MPEP § 2144.05(II) is inappropriate. The Applicant has merely presented these limitations to avoid accidental anticipation by inapposite prior art.

The Examiner has been requested in the previous response to the Office Action dated June 25, 2007 to provide the basis for the Examiner’s view that the limitations at issue represent optimization and to provide the basis for the Examiner’s assertion of obviousness in view of Ren, both motivated by *In re Ahlert and Kruger*, 165 USPQ 418 (CCPA 1970). Unfortunately, no basis has been offered by the Examiner.

Accordingly, the Applicant respectfully requests that the Examiner’s 35 U.S.C. § 103(a) rejection of claims 3 and 8 be reversed.

**Issue 12 — Rejection of Claim 14 Under 35 U.S.C. § 102(e) and/or 35 U.S.C. § 103(a)**

In the Office Action, page 7, item 7, independent claim 14 has been rejected under 35 U.S.C. § 102(e) as supposedly anticipated by Beckmann. Alternatively, the Examiner has rejected independent claim 14 under 35 U.S.C. § 103(a) as supposedly obvious in view of Beckmann.

The Examiner rejected claim 14 on the view that col. 2, lines 47-50 of Beckmann disclose “wherein the stirring occurs as a result of a human user moving the cell while it is in use.”

Col. 2, lines 47-50 of Beckmann states:

“In water collector 18, water from entering cathodic effluent is collected and recirculated back to the pump or mixing chamber using either passive management, or a pump to induce said recirculation.”

The undersigned has diligently studied this portion of Beckmann and is unable to find where it is disclosed that “the stirring occurs as a result of a human user moving the fuel cell while it is in use.” Unfortunately, the Examiner failed to respond in any way to this very argument presented by the Applicant after the first Office Action, dated June 25, 2007. The most reasonable conclusion is that the Examiner was in error when alleging that all of the limitations of claim 14 are taught in Beckmann.

In the Examiner’s alternate rejection theory of obviousness, the examiner stated, “the claim is obvious because if a human moves the fuel cell while it is in use, inherently, stirring would occur during its movement.”

In addition, the Examiner failed to offer any basis for the Examiner's view one skilled in the art would supposedly read the cited Beckmann passage and in turn infer that a human user should or could adequately stir the solution by way of in-use agitation by the human user. Therefore, the Applicant respectfully points out that any evidence of said basis is absent from the record before the Board.

Moreover, the Examiner's assertion of a 35 U.S.C. § 103(a) obviousness rejection seems misplaced; rather, the Examiner is really making another attempt to assert anticipation via inherency and accidental anticipation. If some amount of stirring within a fuel cell is "accidentally and unwittingly produced, whilst the [user was] in pursuit of other or different results, without exciting attention and without it even being known what was done or how it had been done, it would be absurd to say that this was an anticipation . . .". See *Tilghman v. Proctor*, 102 U.S. 707, 712, 26 L.Ed. 279 (1880); see also *In re Seaborg*, 328 F.2d 996, 998-9 140 USPQ 662, 663-4 (CCPA 1964) (incidental, undetected, and inherent production of Americium in Fermi reactors did not anticipate the Seaborg patent for the generation of Americium). Inherency must not be a matter of possibility or probability. See *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1269, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). Conjecture or the possibility of making slight modifications to known technology would not do. *Id.* Instead, the subject matter asserted to be present via inherency must necessarily form part of the reference's technical disclosure. *Id.* Inherency must be judged from the perspective of a person of ordinary skill in the art. *Id.*

In this case, the Examiner has not offered any reason as to why any accidental stirring by a user of a fuel cell, where such fuel agitation is sporadic and unappreciated, should defeat novelty and/or be found obvious. "[C]hance hits in the dark will not anticipate an invention." See *United Chromium, Inc. v. International Silver Co.*, 60 F.2d 913, 917 (2d Cir. 1932).

Accordingly, for all of the reasons discussed above, the Applicant respectfully requests that the Examiner's 35 U.S.C. § 102(e) rejection of claim 14 and the Examiner's 35 U.S.C. § 103(a) rejection of claim 14 both be reversed.

**(viii) Claims Appendix**

1. Direct methanol fuel cell apparatus comprising:
  - a fuel container;
  - an anode adjacent the fuel container;

a proton exchange membrane adjacent the anode;  
a cathode adjacent the proton exchange membrane;  
an oxygen supply adjacent the cathode;  
the fuel container containing methanol in water at a first concentration;  
a cartridge selectively communicatively coupled with the fuel container;  
the cartridge containing fluid comprising methanol in water at a second concentration, the second concentration higher than the first concentration.

2. The apparatus of claim 1 wherein the second concentration is at least double the first concentration.
3. The apparatus of claim 2 wherein the second concentration is at least triple the first concentration.
4. The apparatus of claim 1 wherein the selective communicative coupling comprises a pushing pin by a human user, said pin puncturing the cartridge.
5. The apparatus of claim 1 wherein the selective communicative coupling comprises a pump actuable by electronic means, said pump pumping fluid from the cartridge to the container.
6. A method for use with a direct methanol fuel cell, the method comprising the steps of:  
bringing a first solution of methanol in water at a first concentration into contact with an anode, the first solution contained within a container;  
bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;  
at a later time, bringing a cartridge into communicative coupling with the container, the volume of the container being greater than the volume of the cartridge, the cartridge containing a second solution of methanol in water at a second concentration, the second concentration higher than the first concentration.
7. The method of claim 6 wherein the second concentration is at least double the first concentration.

8. The method of claim 7 wherein the second concentration is at least triple the first concentration.
9. The method of claim 6 wherein the step of bringing the cartridge into communicative coupling with the container comprises a human user pushing a pin, said pin puncturing the cartridge.
10. The method of claim 6 wherein the step of bringing the cartridge into communicative coupling with the container comprises actuating a pump, said pump pumping fluid from the cartridge to the container.
11. Direct methanol fuel cell apparatus comprising:
  - a fuel container;
  - an anode adjacent the fuel container;
  - a proton exchange membrane adjacent the anode;
  - a cathode adjacent the proton exchange membrane;
  - an oxygen supply adjacent the cathode;
  - the fuel container containing methanol in water; and
  - a stirrer within the fuel container.
12. The apparatus of claim 11 further comprising electronics operating the stirrer at intervals as a function of measurements made regarding the fuel cell apparatus.
13. A method for use with a direct methanol fuel cell, the method comprising the steps of:
  - bringing a solution of methanol in water at a first concentration into contact with an anode, the solution contained within a container;
  - bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;
  - at a later time, stirring the solution wherein the stirring occurs as a result of stirring by a stirrer contained within the container.
14. A method for use with a direct methanol fuel cell, the method comprising the steps of:

bringing a solution of methanol in water at a first concentration into contact with an anode, the solution contained within a container;

bringing oxygen into contact with a cathode, the cathode adjacent a proton exchange membrane and the proton exchange membrane adjacent the anode;

at a later time, stirring the solution, wherein the stirring occurs as a result of a human user moving the fuel cell while it is in use.

15. (Cancelled)

16. Direct methanol fuel cell apparatus comprising:

a fuel container;

an anode adjacent the fuel container;

a proton exchange membrane adjacent the anode;

a cathode adjacent the proton exchange membrane;

an oxygen supply adjacent the cathode;

the fuel container containing methanol in water at a first concentration;

a cartridge selectively communicatively coupled with the fuel container;

the fuel container having a greater volume than that of the cartridge;

the cartridge containing fluid comprising methanol in water at a second concentration, the second concentration higher than the first concentration.

17. The apparatus of Claim 4 further comprising a safety lock serving to prevent inadvertent pushing of the pin.

18. The apparatus of Claim 4 further characterized in that the pin is movable in relation to the fuel container.

19. The apparatus of Claim 1 further characterized in that the cartridge selectively communicatively coupled with the fuel container is stationary with respect to the fuel container.



(ix) **Evidence Appendix**

No additional evidence has been submitted with this appeal brief.

(x) **Related Proceedings Appendix**

There are no other related proceedings.

**Conclusion**

Based on the arguments provided herein, the reversal of all claim rejections is requested.

Respectfully submitted,

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